

Appendix G

Best Fit Data-Calculations of 95% UCL on the Arithmetic Mean and Hypothesis Testing

Gkhoury

General UCL Statistics for Full Data Sets

Pb210

Arsenic

General Statistics
Number of Valid Observations 84 Number of Distinct Observations
Number of Missing Values 2

Raw Statistics Log-transformed Statistics
Minimum 0.016 Minimum of Log Data
Maximum 10.6 Maximum of Log Data
Mean 4.497 Mean of log Data
Median 4.335 SD of log Data
SD 1.446
Std. Error of Mean 0.158
Coefficient of Variation 0.322
Skewness 0.816

Relevant UCL Statistics
Normal Distribution Test Lognormal Distribution Test
Lilliefors Test Statistic 0.087 Lilliefors Test Statistic 0.25
Lilliefors Critical Value 0.0967 Lilliefors Critical Value 0.0967
Data appear Normal at 5% Significance Level Data not Lognormal at 5% Significance Level

Assuming Normal Distribution Assuming Lognormal Distribution
95% Student's-t UCL 4.759 95% H-UCL 5.948
95% UCLs (Adjusted for Skewness) 95% Chebyshev (MVUE) UCL 6.925
95% Adjusted-CLT UCL (Chen-1995) 4.771 97.5% Chebyshev (MVUE) UCL 7.708
95% Modified-t UCL (Johnson-1978) 4.761 99% Chebyshev (MVUE) UCL 9.244

Gamma Distribution Test Data Distribution
k star (bias corrected) 5.146 Data appear Normal at 5% Significance Level
Theta Star 0.874
MLE of Mean 4.497
MLE of Standard Deviation 1.982
nu star 864.5

Approximate Chi Square Value (.05) 797.3 Nonparametric Statistics
Adjusted Level of Significance 0.0471 95% CLT UCL 4.756
Adjusted Chi Square Value 796.1 95% Jackknife UCL 4.759
95% Standard Bootstrap UCL 4.757

Anderson-Darling Test Statistic 4.028 95% Bootstrap-t UCL 4.77
Anderson-Darling 5% Critical Value 0.754 95% Hall's Bootstrap UCL 4.787
Kolmogorov-Smirnov Test Statistic 0.158 95% Percentile Bootstrap UCL 4.74
Kolmogorov-Smirnov 5% Critical Value 0.0977 95% BCA Bootstrap UCL 4.774
Data not Gamma Distributed at 5% Significance Level 95% Chebyshev(Mean, Sd) UCL 5.184
97.5% Chebyshev(Mean, Sd) UCL 5.482

Assuming Gamma Distribution 99% Chebyshev(Mean, Sd) UCL 6.066
95% Approximate Gamma UCL 4.876
95% Adjusted Gamma UCL 4.883

Potential UCL to Use Use 95% Student's-t UCL 4.759

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General Statistics

Number of Valid Observations
Number of Missing Values

4 Number of Distinct Observations
78

4

Warning: This data set only has 4 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Pb210 was not processed!

-4.135
2.361 It is suggested to collect at least 8 to 10 observations before using these statistical methods!
1.407 If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.
0.677

Ba140

Lead

General Statistics
Number of Valid Observations 84 Number of Distinct Observations
Number of Missing Values 2

Raw Statistics Log-transformed Statistics
Minimum 0.019 Minimum of Log Data
Maximum 27.7 Maximum of Log Data
Mean 12.75 Mean of log Data
Median 12.15 SD of log Data
SD 5.337
Std. Error of Mean 0.582
Coefficient of Variation 0.418
Skewness 0.708

Relevant UCL Statistics
Normal Distribution Test Lognormal Distribution Test
Lilliefors Test Statistic 0.112 Lilliefors Test Statistic 0.207
Lilliefors Critical Value 0.0967 Lilliefors Critical Value 0.0967
Data not Normal at 5% Significance Level Data not Lognormal at 5% Significance Level

Assuming Normal Distribution Assuming Lognormal Distribution
95% Student's-t UCL 13.72 95% H-UCL 18.34
95% UCLs (Adjusted for Skewness) 95% Chebyshev (MVUE) UCL 21.8
95% Adjusted-CLT UCL (Chen-1995) 13.76 97.5% Chebyshev (MVUE) UCL 24.64
95% Modified-t UCL (Johnson-1978) 13.73 99% Chebyshev (MVUE) UCL 30.23

Gamma Distribution Test Data Distribution
k star (bias corrected) 3.595 Data do not follow a Discernable Distribution (0.05)
Theta Star 3.547
MLE of Mean 12.75
MLE of Standard Deviation 6.726
nu star 604

Approximate Chi Square Value (.05) 547.9 Nonparametric Statistics
Adjusted Level of Significance 0.0471 95% CLT UCL 13.71
Adjusted Chi Square Value 547 95% Jackknife UCL 13.72
95% Standard Bootstrap UCL 13.72

Anderson-Darling Test Statistic 1.779 95% Bootstrap-t UCL 13.72
Anderson-Darling 5% Critical Value 0.757 95% Hall's Bootstrap UCL 13.78
Kolmogorov-Smirnov Test Statistic 0.119 95% Percentile Bootstrap UCL 13.71
Kolmogorov-Smirnov 5% Critical Value 0.098 95% BCA Bootstrap UCL 13.71
Data not Gamma Distributed at 5% Significance Level 95% Chebyshev(Mean, Sd) UCL 15.29
97.5% Chebyshev(Mean, Sd) UCL 16.39

Assuming Gamma Distribution 99% Chebyshev(Mean, Sd) UCL 18.55
95% Approximate Gamma UCL 14.06
95% Adjusted Gamma UCL 14.08

Potential UCL to Use Use 95% Chebyshev (Mean, Sd) UCL 15.29

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

General Statistics

Number of Valid Observations

86 Number of Distinct Observations

1

74
Warning: There is only one distinct observation value in this data set - resulting in '0' variance!
ProUCL (or any other software) should not be used on such a data set!
The data set for variable Ba140 was not processed!
-3.963
3.321 If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.
2.405 The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTv).
0.803

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Molybdenum			Co60		
General Statistics			General Statistics		
Number of Valid Observations	84	Number of Distinct Observations	77	Number of Valid Observations	86
Number of Missing Values	2			Number of Distinct Observations	1
Raw Statistics			Warning: There is only one distinct observation value in this data set - resulting in '0' variance! ProUCL (or any other software) should not be used on such a data set! The data set for variable Co60 was not processed!		
Minimum	0.023	Log-transformed Statistics	-3.772	Minimum of Log Data	0.554
Maximum	1.74	Minimum of Log Data	-0.428	Maximum of Log Data	0.523
Mean	0.719	Mean of log Data	If possible, compute and collect Data Quality Objectives (DQOs) based sample size and analytical results.		
Median	0.657	SD of log Data	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).		
SD	0.288				
Std. Error of Mean	0.0314				
Coefficient of Variation	0.401				
Skewness	0.768				
Relevant UCL Statistics					
Normal Distribution Test		Lognormal Distribution Test			
Lilliefors Test Statistic	0.109	Lilliefors Test Statistic	0.102		
Lilliefors Critical Value	0.0967	Lilliefors Critical Value	0.0967		
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level			
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL	0.771	95% H-UCL	0.832		
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.943		
95% Adjusted-CLT UCL (Chen-1995)	0.774	97.5% Chebyshev (MVUE) UCL	1.028		
95% Modified-t UCL (Johnson-1978)	0.772	99% Chebyshev (MVUE) UCL	1.196		
Gamma Distribution Test			Data Distribution		
k star (bias corrected)	5.092	Data appear Gamma Distributed at 5% Significance Level			
Theta Star	0.141				
MLE of Mean	0.719				
MLE of Standard Deviation	0.319				
nu star	855.4				
Approximate Chi Square Value (.05)	788.5	Nonparametric Statistics			
Adjusted Level of Significance	0.0471	95% CLT UCL	0.771		
Adjusted Chi Square Value	787.4	95% Jackknife UCL	0.771		
		95% Standard Bootstrap UCL	0.771		
Anderson-Darling Test Statistic	0.656	95% Bootstrap-t UCL	0.775		
Anderson-Darling 5% Critical Value	0.754	95% Hall's Bootstrap UCL	0.773		
Kolmogorov-Smirnov Test Statistic	0.0648	95% Percentile Bootstrap UCL	0.773		
Kolmogorov-Smirnov 5% Critical Value	0.0977	95% BCA Bootstrap UCL	0.773		
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.856		
		97.5% Chebyshev(Mean, Sd) UCL	0.915		
		99% Chebyshev(Mean, Sd) UCL	1.032		
Assuming Gamma Distribution					
95% Approximate Gamma UCL	0.78				
95% Adjusted Gamma UCL	0.781				
Potential UCL to Use		Use 95% Approximate Gamma UCL	0.78		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.					

Selenium

General Statistics					
Number of Valid Observations	46	Number of Distinct Observations	45		
Number of Missing Values	31				
Raw Statistics			Log-transformed Statistics		
Minimum	0.022	Minimum of Log Data	-3.817		
Maximum	2.2	Maximum of Log Data	0.788		
Mean	0.615	Mean of log Data	-0.651		
Median	0.531	SD of log Data	0.66		
SD	0.367				
Std. Error of Mean	0.0541				
Coefficient of Variation	0.597				
Skewness	2.299				
Relevant UCL Statistics					
Normal Distribution Test		Lognormal Distribution Test			
Shapiro Wilk Test Statistic	0.811	Shapiro Wilk Test Statistic	0.827		
Shapiro Wilk Critical Value	0.945	Shapiro Wilk Critical Value	0.945		
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level			
Assuming Normal Distribution			Assuming Lognormal Distribution		
95% Student's-t UCL	0.706	95% H-UCL	0.789		
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.941		
95% Adjusted-CLT UCL (Chen-1995)	0.723	97.5% Chebyshev (MVUE) UCL	1.069		
95% Modified-t UCL (Johnson-1978)	0.709	99% Chebyshev (MVUE) UCL	1.321		
Gamma Distribution Test			Data Distribution		
k star (bias corrected)	3.001	Data Follow Appr. Gamma Distribution at 5% Significance Level			
Theta Star	0.205				
MLE of Mean	0.615				
MLE of Standard Deviation	0.355				
nu star	276.1				
Approximate Chi Square Value (.05)	238.6	Nonparametric Statistics			
Adjusted Level of Significance	0.0448	95% CLT UCL	0.704		
Adjusted Chi Square Value	237.5	95% Jackknife UCL	0.706		
		95% Standard Bootstrap UCL	0.703		
Anderson-Darling Test Statistic	1.031	95% Bootstrap-t UCL	0.73		
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	0.772		
Kolmogorov-Smirnov Test Statistic	0.127	95% Percentile Bootstrap UCL	0.707		
Kolmogorov-Smirnov 5% Critical Value	0.131	95% BCA Bootstrap UCL	0.72		
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.851		
		97.5% Chebyshev(Mean, Sd) UCL	0.953		
		99% Chebyshev(Mean, Sd) UCL	1.153		
Assuming Gamma Distribution					
95% Approximate Gamma UCL	0.711				
95% Adjusted Gamma UCL	0.715				

Potential UCL to Use	Use 95% Approximate Gamma UCL	0.711
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics		
Number of Valid Observations	46	Number of Distinct Observations 40
Number of Missing Values	31	
Raw Statistics		
	Log-transformed Statistics	
Minimum	0.022	Minimum of Log Data -3.817
Maximum	38.9	Maximum of Log Data 3.661
Mean	23.95	Mean of log Data 3.011
Median	23.4	SD of log Data 1.064
SD	7.383	
Std. Error of Mean	1.088	
Coefficient of Variation	0.308	
Skewness	-0.338	
Relevant UCL Statistics		
Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.973	Shapiro Wilk Test Statistic 0.365
Shapiro Wilk Critical Value	0.945	Shapiro Wilk Critical Value 0.945
Data appear Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		
95% Student's-t UCL	25.78	95% H-UCL 52.26
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 63.65
95% Adjusted-CLT UCL (Chen-1995)	25.68	97.5% Chebyshev (MVUE) UCL 76.01
95% Modified-t UCL (Johnson-1978)	25.77	99% Chebyshev (MVUE) UCL 100.3
Gamma Distribution Test		
k star (bias corrected)	2.993	Data appear Normal at 5% Significance Level
Theta Star	8.002	
MLE of Mean	23.95	
MLE of Standard Deviation	13.84	
nu star	275.4	
Approximate Chi Square Value (.05)	237.9	Nonparametric Statistics
Adjusted Level of Significance	0.0448	95% CLT UCL 25.74
Adjusted Chi Square Value	236.8	95% Jackknife UCL 25.78
		95% Standard Bootstrap UCL 25.78
Anderson-Darling Test Statistic	4.515	95% Bootstrap-t UCL 25.75
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL 25.66
Kolmogorov-Smirnov Test Statistic	0.237	95% Percentile Bootstrap UCL 25.7
Kolmogorov-Smirnov 5% Critical Value	0.131	95% BCA Bootstrap UCL 25.64
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 28.7
		97.5% Chebyshev(Mean, Sd) UCL 30.75
		99% Chebyshev(Mean, Sd) UCL 34.78
Assuming Gamma Distribution		
95% Approximate Gamma UCL	27.72	
95% Adjusted Gamma UCL	27.85	
Potential UCL to Use	Use 95% Student's-t UCL	25.78

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

General UCL Statistics for Full Data Sets		
Confidence Coefficient	95%	
Number of Bootstrap Operations	2000	

Alpha

General Statistics		
Number of Valid Observations	86	Number of Distinct Observations 55
Raw Statistics		
	Log-transformed Statistics	
Minimum	0.8	Minimum of Log Data -0.223
Maximum	26.6	Maximum of Log Data 3.281
Mean	8.047	Mean of log Data 1.98
Median	7.85	SD of log Data 0.488
SD	3.753	
Std. Error of Mean	0.405	
Coefficient of Variation	0.466	
Skewness	1.788	
Relevant UCL Statistics		
Normal Distribution Test	Lognormal Distribution Test	
Lilliefors Test Statistic	0.105	Lilliefors Test Statistic 0.102
Lilliefors Critical Value	0.0955	Lilliefors Critical Value 0.0955
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		
95% Student's-t UCL	8.72	95% H-UCL 8.992
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 10.11
95% Adjusted-CLT UCL (Chen-1995)	8.796	97.5% Chebyshev (MVUE) UCL 10.96
95% Modified-t UCL (Johnson-1978)	8.733	99% Chebyshev (MVUE) UCL 12.63
Gamma Distribution Test		
k star (bias corrected)	4.758	Data appear Gamma Distributed at 5% Significance Level
Theta Star	1.691	
MLE of Mean	8.047	
MLE of Standard Deviation	3.689	
nu star	818.3	
Approximate Chi Square Value (.05)	752.9	Nonparametric Statistics
Adjusted Level of Significance	0.0472	95% CLT UCL 8.712
Adjusted Chi Square Value	751.9	95% Jackknife UCL 8.72
		95% Standard Bootstrap UCL 8.72
Anderson-Darling Test Statistic	0.653	95% Bootstrap-t UCL 8.831

Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	8.892
Kolmogorov-Smirnov Test Statistic	0.0755	95% Percentile Bootstrap UCL	8.733
Kolmogorov-Smirnov 5% Critical Value	0.0967	95% BCA Bootstrap UCL	8.835
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9.811
		97.5% Chebyshev(Mean, Sd) UCL	10.57
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12.07
95% Approximate Gamma UCL	8.745		
95% Adjusted Gamma UCL	8.758		
Potential UCL to Use		Use 95% Approximate Gamma UCL	8.745

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Beta

General Statistics			
Number of Valid Observations	86	Number of Distinct Observations	69
Raw Statistics		Log-transformed Statistics	
Minimum	11	Minimum of Log Data	2.398
Maximum	42.7	Maximum of Log Data	3.754
Mean	25.93	Mean of log Data	3.237
Median	25.85	SD of log Data	0.2
SD	4.966		
Std. Error of Mean	0.536		
Coefficient of Variation	0.192		
Skewness	0.268		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.0856	Lilliefors Test Statistic	0.0546
Lilliefors Critical Value	0.0955	Lilliefors Critical Value	0.0955
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	26.82	95% H-UCL	26.94
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	28.42
95% Adjusted-CLT UCL (Chen-1995)	26.83	97.5% Chebyshev (MVUE) UCL	29.48
95% Modified-t UCL (Johnson-1978)	26.83	99% Chebyshev (MVUE) UCL	31.58
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	25.61	Data appear Normal at 5% Significance Level	
Theta Star	1.013		
MLE of Mean	25.93		
MLE of Standard Deviation	5.124		
nu star	4405		
Approximate Chi Square Value (.05)	4252	Nonparametric Statistics	
Adjusted Level of Significance	0.0472	95% CLT UCL	26.81
Adjusted Chi Square Value	4250	95% Jackknife UCL	26.82
		95% Standard Bootstrap UCL	26.8
Anderson-Darling Test Statistic	0.299	95% Bootstrap-t UCL	26.83
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	26.8
Kolmogorov-Smirnov Test Statistic	0.0624	95% Percentile Bootstrap UCL	26.79
Kolmogorov-Smirnov 5% Critical Value	0.0961	95% BCA Bootstrap UCL	26.83
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	28.27
		97.5% Chebyshev(Mean, Sd) UCL	29.28
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	31.26
95% Approximate Gamma UCL	26.87		
95% Adjusted Gamma UCL	26.88		
Potential UCL to Use		Use 95% Student's-t UCL	26.82

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Bi212

General Statistics			
Number of Valid Observations	86	Number of Distinct Observations	56
Raw Statistics		Log-transformed Statistics	
Minimum	0.48	Minimum of Log Data	-0.734
Maximum	1.57	Maximum of Log Data	0.451
Mean	1.017	Mean of log Data	-0.0192
Median	1.045	SD of log Data	0.277
SD	0.263		
Std. Error of Mean	0.0284		
Coefficient of Variation	0.259		
Skewness	-0.0454		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.0912	Lilliefors Test Statistic	0.11
Lilliefors Critical Value	0.0955	Lilliefors Critical Value	0.0955
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.064	95% H-UCL	1.074
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.154
95% Adjusted-CLT UCL (Chen-1995)	1.064	97.5% Chebyshev (MVUE) UCL	1.212
95% Modified-t UCL (Johnson-1978)	1.064	99% Chebyshev (MVUE) UCL	1.327
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	13.56	Data appear Normal at 5% Significance Level	
Theta Star	0.075		
MLE of Mean	1.017		
MLE of Standard Deviation	0.276		
nu star	2332		
Approximate Chi Square Value (.05)	2220	Nonparametric Statistics	
Adjusted Level of Significance	0.0472	95% CLT UCL	1.064
Adjusted Chi Square Value	2219	95% Jackknife UCL	1.064
		95% Standard Bootstrap UCL	1.064

Anderson-Darling Test Statistic	0.891	95% Bootstrap-t UCL	1.063
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	1.063
Kolmogorov-Smirnov Test Statistic	0.0968	95% Percentile Bootstrap UCL	1.064
Kolmogorov-Smirnov 5% Critical Value	0.0962	95% BCA Bootstrap UCL	1.064
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.141
		97.5% Chebyshev(Mean, Sd) UCL	1.194
		99% Chebyshev(Mean, Sd) UCL	1.3
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1.068		
95% Adjusted Gamma UCL	1.069		
Potential UCL to Use		Use 95% Student's-t UCL	1.064

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

Bi214

General Statistics			
Number of Valid Observations	86	Number of Distinct Observations	62
Raw Statistics			
	Log-transformed Statistics		
Minimum	0.494	Minimum of Log Data	-0.705
Maximum	2.79	Maximum of Log Data	1.026
Mean	1.087	Mean of log Data	0.0334
Median	0.97	SD of log Data	0.313
SD	0.368		
Std. Error of Mean	0.0397		
Coefficient of Variation	0.339		
Skewness	1.509		
Relevant UCL Statistics			
Normal Distribution Test	Lognormal Distribution Test		
Lilliefors Test Statistic	0.162	Lilliefors Test Statistic	0.113
Lilliefors Critical Value	0.0955	Lilliefors Critical Value	0.0955
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution			
95% Student's-t UCL	1.153	95% H-UCL	1.153
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.249
95% Adjusted-CLT UCL (Chen-1995)	1.159	97.5% Chebyshev (MVUE) UCL	1.32
95% Modified-t UCL (Johnson-1978)	1.154	99% Chebyshev (MVUE) UCL	1.459
Gamma Distribution Test			
	Data Distribution		
k star (bias corrected)	9.791	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.111		
MLE of Mean	1.087		
MLE of Standard Deviation	0.347		
nu star	1684		
Approximate Chi Square Value (.05)	1590	Nonparametric Statistics	
Adjusted Level of Significance	0.0472	95% CLT UCL	1.152
Adjusted Chi Square Value	1588	95% Jackknife UCL	1.153
		95% Standard Bootstrap UCL	1.153
Anderson-Darling Test Statistic	0.942	95% Bootstrap-t UCL	1.163
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	1.159
Kolmogorov-Smirnov Test Statistic	0.133	95% Percentile Bootstrap UCL	1.153
Kolmogorov-Smirnov 5% Critical Value	0.0963	95% BCA Bootstrap UCL	1.156
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.26
		97.5% Chebyshev(Mean, Sd) UCL	1.335
		99% Chebyshev(Mean, Sd) UCL	1.482
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1.152		
95% Adjusted Gamma UCL	1.153		
Potential UCL to Use		Use 95% Student's-t UCL	1.153
		or 95% Modified-t UCL	1.154

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

I131

Cs137

General Statistics			
Number of Valid Observations	86	Number of Distinct Observations	1
Warning: There is only one distinct observation value in this data set - resulting in '0' variance! ProUCL (or any other software) should not be used on such a data set! The data set for variable I131 was not processed!			
Raw Statistics			
	Log-transformed Statistics		
Minimum	0.0113	Minimum of Log Data	-4.483
Maximum	0.123	Maximum of Log Data	-2.096
Mean	0.0628	Mean of log Data	-2.842
Median	0.061	SD of log Data	0.42
SD	0.0223		
Std. Error of Mean	0.0024		
Coefficient of Variation	0.354		
Skewness	0.253		
Relevant UCL Statistics			
Normal Distribution Test	Lognormal Distribution Test		
Lilliefors Test Statistic	0.0517	Lilliefors Test Statistic	0.0841
Lilliefors Critical Value	0.0955	Lilliefors Critical Value	0.0955
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution			
95% Student's-t UCL	0.0668	95% H-UCL	0.0691
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0766
95% Adjusted-CLT UCL (Chen-1995)	0.0668	97.5% Chebyshev (MVUE) UCL	0.0823
95% Modified-t UCL (Johnson-1978)	0.0668	99% Chebyshev (MVUE) UCL	0.0933
Gamma Distribution Test			
	Data Distribution		
k star (bias corrected)	6.657	Data appear Normal at 5% Significance Level	
Theta Star	0.00943		
MLE of Mean	0.0628		

MLE of Standard Deviation	0.0243		
nu star	1145		
Approximate Chi Square Value (.05)	1067	Nonparametric Statistics	
Adjusted Level of Significance	0.0472	95% CLT UCL	0.0668
Adjusted Chi Square Value	1066	95% Jackknife UCL	0.0668
		95% Standard Bootstrap UCL	0.0667
Anderson-Darling Test Statistic	0.406	95% Bootstrap-t UCL	0.067
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL	0.0668
Kolmogorov-Smirnov Test Statistic	0.0555	95% Percentile Bootstrap UCL	0.0668
Kolmogorov-Smirnov 5% Critical Value	0.0965	95% BCA Bootstrap UCL	0.0668
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0733
		97.5% Chebyshev(Mean, Sd) UCL	0.0778
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.0867
95% Approximate Gamma UCL	0.0674		
95% Adjusted Gamma UCL	0.0675		
Potential UCL to Use		Use 95% Student's-t UCL	0.0668

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

K40

General Statistics			
Number of Valid Observations	86	Number of Distinct Observations	49
Raw Statistics		Log-transformed Statistics	
Minimum	12.7	Minimum of Log Data	2.542
Maximum	20.7	Maximum of Log Data	3.03
Mean	16.48	Mean of log Data	2.797
Median	16.75	SD of log Data	0.105
SD	1.702		
Std. Error of Mean	0.184		
Coefficient of Variation	0.103		
Skewness	-0.151		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.0854	Lilliefors Test Statistic	0.104
Lilliefors Critical Value	0.0955	Lilliefors Critical Value	0.0955
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	16.79	95% H-UCL	16.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	17.3
95% Adjusted-CLT UCL (Chen-1995)	16.78	97.5% Chebyshev (MVUE) UCL	17.66
95% Modified-t UCL (Johnson-1978)	16.79	99% Chebyshev (MVUE) UCL	18.35
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	89.6	Data appear Normal at 5% Significance Level	
Theta Star	0.184		
MLE of Mean	16.48		
MLE of Standard Deviation	1.741		
nu star	15411		
Approximate Chi Square Value (.05)	15123	Nonparametric Statistics	
Adjusted Level of Significance	0.0472	95% CLT UCL	16.79
Adjusted Chi Square Value	15118	95% Jackknife UCL	16.79
		95% Standard Bootstrap UCL	16.79
Anderson-Darling Test Statistic	0.634	95% Bootstrap-t UCL	16.78
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL	16.79
Kolmogorov-Smirnov Test Statistic	0.0986	95% Percentile Bootstrap UCL	16.79
Kolmogorov-Smirnov 5% Critical Value	0.0961	95% BCA Bootstrap UCL	16.79
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	17.28
		97.5% Chebyshev(Mean, Sd) UCL	17.63
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18.31
95% Approximate Gamma UCL	16.8		
95% Adjusted Gamma UCL	16.8		
Potential UCL to Use		Use 95% Student's-t UCL	16.79

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positively skewed data sets.

Pa234m

General Statistics			
Number of Valid Observations	65	Number of Distinct Observations	45
Number of Missing Values	21		
Raw Statistics		Log-transformed Statistics	
Minimum	0	Log Statistics Not Available	
Maximum	4.8		
Mean	1.631		
Median	1.4		
SD	0.905		
Std. Error of Mean	0.112		
Coefficient of Variation	0.555		
Skewness	0.835		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.135	Not Available	
Lilliefors Critical Value	0.11		
Data not Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.818	95% H-UCL	N/A

Assuming Normal Distribution		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1.818	95% Adjusted-CLT UCL (Chen 1995)	1.828
		95% Modified-t UCL (Johnson-1978)	1.82
Gamma Distribution Test		Data Distribution	
Gamma Statistics Not Available		Data do not follow a Discernable Distribution (0.05)	
Potential UCL to Use			
Use 95% Chebyshev (Mean, Sd) UCL	2.12	95% CLT UCL	1.816
		95% Jackknife UCL	1.818
		95% Standard Bootstrap UCL	1.81
		95% Bootstrap-t UCL	1.822
		95% Hall's Bootstrap UCL	1.842
		95% Percentile Bootstrap UCL	1.827
		95% BCA Bootstrap UCL	1.83
		95% Chebyshev(Mean, Sd) UCL	2.12
		97.5% Chebyshev(Mean, Sd) UCL	2.332
		99% Chebyshev(Mean, Sd) UCL	2.747

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Pb212

General Statistics			
Number of Valid Observations	86	Number of Distinct Observations	66
Raw Statistics		Log-transformed Statistics	
Minimum	0.518	Minimum of Log Data	-0.658
Maximum	1.59	Maximum of Log Data	0.464
Mean	0.961	Mean of log Data	-0.0765
Median	0.965	SD of log Data	0.275
SD	0.257		
Std. Error of Mean	0.0277		
Coefficient of Variation	0.267		
Skewness	0.23		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test			
Lilliefors Test Statistic	0.0877	Lilliefors Test Statistic	0.0692
Lilliefors Critical Value	0.0955	Lilliefors Critical Value	0.0955
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.007	95% H-UCL	1.013
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.088
95% Adjusted-CLT UCL (Chen-1995)	1.007	97.5% Chebyshev (MVUE) UCL	1.143
95% Modified-t UCL (Johnson-1978)	1.007	99% Chebyshev (MVUE) UCL	1.251
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	13.39	Data appear Normal at 5% Significance Level	
Theta Star	0.0718		
MLE of Mean	0.961		
MLE of Standard Deviation	0.263		
nu star	2302		
Approximate Chi Square Value (.05)	2192	Nonparametric Statistics	
Adjusted Level of Significance	0.0472	95% CLT UCL	1.006
Adjusted Chi Square Value	2190	95% Jackknife UCL	1.007
		95% Standard Bootstrap UCL	1.007
Anderson-Darling Test Statistic	0.528	95% Bootstrap-t UCL	1.009
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	1.007
Kolmogorov-Smirnov Test Statistic	0.078	95% Percentile Bootstrap UCL	1.006
Kolmogorov-Smirnov 5% Critical Value	0.0963	95% BCA Bootstrap UCL	1.005
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.081
		97.5% Chebyshev(Mean, Sd) UCL	1.134
		99% Chebyshev(Mean, Sd) UCL	1.236
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1.009		
95% Adjusted Gamma UCL	1.01		
Potential UCL to Use		Use 95% Student's-t UCL	1.007

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Pb214

General Statistics			
Number of Valid Observations	86	Number of Distinct Observations	66
Raw Statistics		Log-transformed Statistics	
Minimum	0.524	Minimum of Log Data	-0.646
Maximum	2.99	Maximum of Log Data	1.095
Mean	1.164	Mean of log Data	0.102
Median	1.045	SD of log Data	0.313
SD	0.392		
Std. Error of Mean	0.0422		
Coefficient of Variation	0.336		
Skewness	1.496		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test			
Lilliefors Test Statistic	0.153	Lilliefors Test Statistic	0.103
Lilliefors Critical Value	0.0955	Lilliefors Critical Value	0.0955
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	1.235 95% H-UCL	1.234
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	1.337
95% Adjusted-CLT UCL (Chen-1995)	1.241 97.5% Chebyshev (MVUE) UCL	1.413
95% Modified-t UCL (Johnson-1978)	1.236 99% Chebyshev (MVUE) UCL	1.562
Gamma Distribution Test	Data Distribution	
k star (bias corrected)	9.861 Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.118	
MLE of Mean	1.164	
MLE of Standard Deviation	0.371	
nu star	1696	
Approximate Chi Square Value (.05)	1602 Nonparametric Statistics	
Adjusted Level of Significance	0.0472 95% CLT UCL	1.234
Adjusted Chi Square Value	1600 95% Jackknife UCL	1.235
	95% Standard Bootstrap UCL	1.233
Anderson-Darling Test Statistic	0.795 95% Bootstrap-t UCL	1.245
Anderson-Darling 5% Critical Value	0.751 95% Hall's Bootstrap UCL	1.244
Kolmogorov-Smirnov Test Statistic	0.122 95% Percentile Bootstrap UCL	1.236
Kolmogorov-Smirnov 5% Critical Value	0.0963 95% BCA Bootstrap UCL	1.24
Data not Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	1.348
	97.5% Chebyshev(Mean, Sd) UCL	1.428
	99% Chebyshev(Mean, Sd) UCL	1.585
Assuming Gamma Distribution		
95% Approximate Gamma UCL	1.233	
95% Adjusted Gamma UCL	1.234	
Potential UCL to Use	Use 95% Student's-t UCL	1.235
	or 95% Modified-t UCL	1.236

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Ra223

General Statistics		
Number of Valid Observations	72 Number of Distinct Observations	60
Number of Missing Values	14	
Raw Statistics	Log-transformed Statistics	
Minimum	0.125 Minimum of Log Data	-2.079
Maximum	0.449 Maximum of Log Data	-0.801
Mean	0.26 Mean of log Data	-1.384
Median	0.252 SD of log Data	0.274
SD	0.0705	
Std. Error of Mean	0.00831	
Coefficient of Variation	0.271	
Skewness	0.484	
Relevant UCL Statistics		
Normal Distribution Test	Lognormal Distribution Test	
Lilliefors Test Statistic	0.0994 Lilliefors Test Statistic	0.0526
Lilliefors Critical Value	0.104 Lilliefors Critical Value	0.104
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	0.274 95% H-UCL	0.275
95% UCLs (Adjusted for Skewness)	95% Chebyshev (MVUE) UCL	0.297
95% Adjusted-CLT UCL (Chen-1995)	0.274 97.5% Chebyshev (MVUE) UCL	0.313
95% Modified-t UCL (Johnson-1978)	0.274 99% Chebyshev (MVUE) UCL	0.345
Gamma Distribution Test	Data Distribution	
k star (bias corrected)	13.28 Data appear Normal at 5% Significance Level	
Theta Star	0.0196	
MLE of Mean	0.26	
MLE of Standard Deviation	0.0713	
nu star	1913	
Approximate Chi Square Value (.05)	1812 Nonparametric Statistics	
Adjusted Level of Significance	0.0467 95% CLT UCL	0.274
Adjusted Chi Square Value	1810 95% Jackknife UCL	0.274
	95% Standard Bootstrap UCL	0.274
Anderson-Darling Test Statistic	0.175 95% Bootstrap-t UCL	0.275
Anderson-Darling 5% Critical Value	0.75 95% Hall's Bootstrap UCL	0.274
Kolmogorov-Smirnov Test Statistic	0.07 95% Percentile Bootstrap UCL	0.274
Kolmogorov-Smirnov 5% Critical Value	0.105 95% BCA Bootstrap UCL	0.273
Data appear Gamma Distributed at 5% Significance Level	95% Chebyshev(Mean, Sd) UCL	0.296
	97.5% Chebyshev(Mean, Sd) UCL	0.312
	99% Chebyshev(Mean, Sd) UCL	0.343
Assuming Gamma Distribution		
95% Approximate Gamma UCL	0.274	
95% Adjusted Gamma UCL	0.275	
Potential UCL to Use	Use 95% Student's-t UCL	0.274

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Ra226

General Statistics		
Number of Valid Observations	86 Number of Distinct Observations	69
Raw Statistics	Log-transformed Statistics	
Minimum	0 Log Statistics Not Available	
Maximum	6.04	
Mean	2.037	
Median	1.825	
SD	0.881	
Std. Error of Mean	0.095	
Coefficient of Variation	0.432	
Skewness	1.399	
Relevant UCL Statistics		

Normal Distribution Test	Lognormal Distribution Test		
Lilliefors Test Statistic	0.141	Not Available	
Lilliefors Critical Value	0.0955		
Data not Normal at 5% Significance Level			
Assuming Normal Distribution	Assuming Lognormal Distribution		
95% Student's-t UCL	2.195	95% H-UCL	N/A
Assuming Normal Distribution	95% UCLs (Adjusted for Skewness)		
95% Student's-t UCL	2.195	95% Adjusted-CLT UCL (Chen 1995)	2.209
		95% Modified-t UCL (Johnson-1978)	2.198
Gamma Distribution Test	Data Distribution		
Gamma Statistics Not Available	Data do not follow a Discernable Distribution (0.05)		
Potential UCL to Use			
Use 95% Chebyshev (Mean, Sd) UCL	2.451	95% CLT UCL	2.193
		95% Jackknife UCL	2.195
		95% Standard Bootstrap UCL	2.19
		95% Bootstrap-t UCL	2.213
		95% Hall's Bootstrap UCL	2.217
		95% Percentile Bootstrap UCL	2.195
		95% BCA Bootstrap UCL	2.199
		95% Chebyshev(Mean, Sd) UCL	2.451
		97.5% Chebyshev(Mean, Sd) UCL	2.63
		99% Chebyshev(Mean, Sd) UCL	2.982

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Ra228

General Statistics			
Number of Valid Observations	86	Number of Distinct Observations	63
Raw Statistics	Log-transformed Statistics		
Minimum	0.498	Minimum of Log Data	-0.697
Maximum	1.58	Maximum of Log Data	0.457
Mean	0.983	Mean of log Data	-0.0507
Median	0.97	SD of log Data	0.263
SD	0.249		
Std. Error of Mean	0.0269		
Coefficient of Variation	0.253		
Skewness	0.147		
Relevant UCL Statistics			
Normal Distribution Test	Lognormal Distribution Test		
Lilliefors Test Statistic	0.0939	Lilliefors Test Statistic	0.0941
Lilliefors Critical Value	0.0955	Lilliefors Critical Value	0.0955
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution	Assuming Lognormal Distribution		
95% Student's-t UCL	1.027	95% H-UCL	1.034
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.107
95% Adjusted-CLT UCL (Chen-1995)	1.027	97.5% Chebyshev (MVUE) UCL	1.161
95% Modified-t UCL (Johnson-1978)	1.027	99% Chebyshev (MVUE) UCL	1.266
Gamma Distribution Test	Data Distribution		
k star (bias corrected)	14.7	Data appear Normal at 5% Significance Level	
Theta Star	0.0668		
MLE of Mean	0.983		
MLE of Standard Deviation	0.256		
nu star	2528		
Approximate Chi Square Value (.05)	2413	Nonparametric Statistics	
Adjusted Level of Significance	0.0472	95% CLT UCL	1.027
Adjusted Chi Square Value	2411	95% Jackknife UCL	1.027
		95% Standard Bootstrap UCL	1.025
Anderson-Darling Test Statistic	0.746	95% Bootstrap-t UCL	1.028
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	1.026
Kolmogorov-Smirnov Test Statistic	0.0801	95% Percentile Bootstrap UCL	1.025
Kolmogorov-Smirnov 5% Critical Value	0.0962	95% BCA Bootstrap UCL	1.03
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.1
		97.5% Chebyshev(Mean, Sd) UCL	1.15
		99% Chebyshev(Mean, Sd) UCL	1.25
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1.03		
95% Adjusted Gamma UCL	1.031		
Potential UCL to Use	Use 95% Student's-t UCL		
			1.027

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Th227

General Statistics		
Number of Valid Observations	62	Number of Distinct Observations
Number of Missing Values	24	
Raw Statistics		Log-transformed Statistics
Minimum	-0.005	Log Statistics Not Available
Maximum	0.32	
Mean	0.0925	
Median	0.081	
SD	0.0687	

Std. Error of Mean	0.00873		
Coefficient of Variation	0.743		
Skewness	1.011		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.118	Not Available	
Lilliefors Critical Value	0.113		
Data not Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.107	95% H-UCL	N/A
Assuming Normal Distribution		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.107	95% Adjusted-CLT UCL (Chen 1995)	0.108
		95% Modified-t UCL (Johnson-1978)	0.107
Gamma Distribution Test		Data Distribution	
Gamma Statistics Not Available		Data do not follow a Discernable Distribution (0.05)	
Potential UCL to Use			
Use 95% Chebyshev (Mean, Sd) UCL	0.131	95% CLT UCL	0.107
		95% Jackknife UCL	0.107
		95% Standard Bootstrap UCL	0.107
		95% Bootstrap-t UCL	0.109
		95% Hall's Bootstrap UCL	0.109
		95% Percentile Bootstrap UCL	0.106
		95% BCA Bootstrap UCL	0.108
		95% Chebyshev(Mean, Sd) UCL	0.131
		97.5% Chebyshev(Mean, Sd) UCL	0.147
		99% Chebyshev(Mean, Sd) UCL	0.179

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Th228

General Statistics			
Number of Valid Observations	56	Number of Distinct Observations	47
Number of Missing Values	30		
Raw Statistics		Log-transformed Statistics	
Minimum	0.48	Minimum of Log Data	-0.734
Maximum	2.63	Maximum of Log Data	0.967
Mean	1.099	Mean of log Data	0.0345
Median	1.01	SD of log Data	0.341
SD	0.408		
Std. Error of Mean	0.0546		
Coefficient of Variation	0.372		
Skewness	1.392		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.153	Lilliefors Test Statistic	0.0826
Lilliefors Critical Value	0.118	Lilliefors Critical Value	0.118
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.19	95% H-UCL	1.188
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.319
95% Adjusted-CLT UCL (Chen-1995)	1.199	97.5% Chebyshev (MVUE) UCL	1.416
95% Modified-t UCL (Johnson-1978)	1.192	99% Chebyshev (MVUE) UCL	1.605
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	8.118	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	0.135		
MLE of Mean	1.099		
MLE of Standard Deviation	0.386		
nu star	909.3		
Approximate Chi Square Value (.05)	840.3	Nonparametric Statistics	
Adjusted Level of Significance	0.0457	95% CLT UCL	1.188
Adjusted Chi Square Value	838.5	95% Jackknife UCL	1.19
		95% Standard Bootstrap UCL	1.187
Anderson-Darling Test Statistic	0.621	95% Bootstrap-t UCL	1.199
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	1.202
Kolmogorov-Smirnov Test Statistic	0.105	95% Percentile Bootstrap UCL	1.19
Kolmogorov-Smirnov 5% Critical Value	0.119	95% BCA Bootstrap UCL	1.193
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.336
		97.5% Chebyshev(Mean, Sd) UCL	1.439
		99% Chebyshev(Mean, Sd) UCL	1.641
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1.189		
95% Adjusted Gamma UCL	1.191		
Potential UCL to Use		Use 95% Approximate Gamma UCL	1.189

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Th230

General Statistics			
Number of Valid Observations	56	Number of Distinct Observations	50
Number of Missing Values	30		

Raw Statistics		Log-transformed Statistics	
Minimum	0.56	Minimum of Log Data	-0.58
Maximum	3.71	Maximum of Log Data	1.311
Mean	1.423	Mean of log Data	0.269
Median	1.26	SD of log Data	0.403
SD	0.647		
Std. Error of Mean	0.0864		
Coefficient of Variation	0.454		
Skewness	1.661		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test			
Lilliefors Test Statistic	0.141	Lilliefors Test Statistic	0.0752
Lilliefors Critical Value	0.118	Lilliefors Critical Value	0.118
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.568	95% H-UCL	1.566
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.76
95% Adjusted-CLT UCL (Chen-1995)	1.586	97.5% Chebyshev (MVUE) UCL	1.909
95% Modified-t UCL (Johnson-1978)	1.571	99% Chebyshev (MVUE) UCL	2.201
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	5.777	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	0.246		
MLE of Mean	1.423		
MLE of Standard Deviation	0.592		
nu star	647.1		
Approximate Chi Square Value (.05)	589.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0457	95% CLT UCL	1.566
Adjusted Chi Square Value	587.6	95% Jackknife UCL	1.568
		95% Standard Bootstrap UCL	1.563
Anderson-Darling Test Statistic	0.792	95% Bootstrap-t UCL	1.601
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL	1.598
Kolmogorov-Smirnov Test Statistic	0.102	95% Percentile Bootstrap UCL	1.571
Kolmogorov-Smirnov 5% Critical Value	0.119	95% BCA Bootstrap UCL	1.587
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.8
		97.5% Chebyshev(Mean, Sd) UCL	1.963
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.283
95% Approximate Gamma UCL	1.564		
95% Adjusted Gamma UCL	1.567		
Potential UCL to Use		Use 95% Approximate Gamma UCL	1.564
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.			

Th232

General Statistics		
Number of Valid Observations	56	Number of Distinct Observations 46
Number of Missing Values	30	
Raw Statistics		
	Log-transformed Statistics	
Minimum	0.46	Minimum of Log Data -0.777
Maximum	1.76	Maximum of Log Data 0.565
Mean	0.952	Mean of log Data -0.0943
Median	0.895	SD of log Data 0.3
SD	0.295	
Std. Error of Mean	0.0395	
Coefficient of Variation	0.31	
Skewness	0.844	
Relevant UCL Statistics		
Normal Distribution Test		
Lilliefors Test Statistic	0.127	Lilliefors Test Statistic 0.0714
Lilliefors Critical Value	0.118	Lilliefors Critical Value 0.118
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		
Assuming Lognormal Distribution		
95% Student's-t UCL	1.018	95% H-UCL 1.019
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 1.12
95% Adjusted-CLT UCL (Chen-1995)	1.021	97.5% Chebyshev (MVUE) UCL 1.193
95% Modified-t UCL (Johnson-1978)	1.018	99% Chebyshev (MVUE) UCL 1.337
Gamma Distribution Test		
Data Distribution		
k star (bias corrected)	10.75	Data appear Gamma Distributed at 5% Significance Level
Theta Star	0.0886	
MLE of Mean	0.952	
MLE of Standard Deviation	0.29	
nu star	1204	
Approximate Chi Square Value (.05)	1124	Nonparametric Statistics
Adjusted Level of Significance	0.0457	95% CLT UCL 1.017
Adjusted Chi Square Value	1122	95% Jackknife UCL 1.018
		95% Standard Bootstrap UCL 1.016
Anderson-Darling Test Statistic	0.531	95% Bootstrap-t UCL 1.022
Anderson-Darling 5% Critical Value	0.75	95% Hall's Bootstrap UCL 1.021
Kolmogorov-Smirnov Test Statistic	0.0913	95% Percentile Bootstrap UCL 1.017
Kolmogorov-Smirnov 5% Critical Value	0.119	95% BCA Bootstrap UCL 1.016
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 1.124
		97.5% Chebyshev(Mean, Sd) UCL 1.198
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 1.344
95% Approximate Gamma UCL	1.019	
95% Adjusted Gamma UCL	1.021	
Potential UCL to Use	Use 95% Approximate Gamma UCL 1.019	
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.		

Th234

General Statistics			
Number of Valid Observations	72	Number of Distinct Observations	51
Number of Missing Values	14		
Raw Statistics			
		Log-transformed Statistics	
Minimum	0	Log Statistics Not Available	
Maximum	4.24		
Mean	0.928		
Median	0.67		
SD	0.682		
Std. Error of Mean	0.0804		
Coefficient of Variation	0.735		
Skewness	2.309		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.214	Not Available	
Lilliefors Critical Value	0.104		
Data not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Student's-t UCL	1.062	Assuming Lognormal Distribution	N/A
95% Student's-t UCL		95% H-UCL	
Assuming Normal Distribution		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1.062	95% Adjusted-CLT UCL (Chen 1995)	1.084
		95% Modified-t UCL (Johnson-1978)	1.066
Gamma Distribution Test			
Gamma Statistics Not Available		Data Distribution	
		Data do not follow a Discernable Distribution (0.05)	
Potential UCL to Use			
Use 95% Chebyshev (Mean, Sd) UCL	1.278	95% CLT UCL	1.06
		95% Jackknife UCL	1.062
		95% Standard Bootstrap UCL	1.06
		95% Bootstrap-t UCL	1.1
		95% Hall's Bootstrap UCL	1.114
		95% Percentile Bootstrap UCL	1.063
		95% BCA Bootstrap UCL	1.078
		95% Chebyshev(Mean, Sd) UCL	1.278
		97.5% Chebyshev(Mean, Sd) UCL	1.43
		99% Chebyshev(Mean, Sd) UCL	1.728

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

T1208

General Statistics			
Number of Valid Observations	86	Number of Distinct Observations	78
Raw Statistics			
		Log-transformed Statistics	
Minimum	0.158	Minimum of Log Data	-1.845
Maximum	0.475	Maximum of Log Data	-0.744
Mean	0.305	Mean of log Data	-1.223
Median	0.303	SD of log Data	0.278
SD	0.0812		
Std. Error of Mean	0.00875		
Coefficient of Variation	0.266		
Skewness	0.111		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Lilliefors Test Statistic	0.0828	Lilliefors Test Statistic	0.0822
Lilliefors Critical Value	0.0955	Lilliefors Critical Value	0.0955
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Student's-t UCL	0.32	Assuming Lognormal Distribution	0.322
95% UCLs (Adjusted for Skewness)		95% H-UCL	
95% Adjusted-CLT UCL (Chen-1995)	0.32	95% Chebyshev (MVUE) UCL	0.346
95% Modified-t UCL (Johnson-1978)	0.32	97.5% Chebyshev (MVUE) UCL	0.364
		99% Chebyshev (MVUE) UCL	0.399
Gamma Distribution Test			
k star (bias corrected)	13.26	Data Distribution	
Theta Star	0.023	Data appear Normal at 5% Significance Level	
MLE of Mean	0.305		
MLE of Standard Deviation	0.0839		
nu star	2280		
Approximate Chi Square Value (.05)	2170	Nonparametric Statistics	
Adjusted Level of Significance	0.0472	95% CLT UCL	0.32
Adjusted Chi Square Value	2168	95% Jackknife UCL	0.32
		95% Standard Bootstrap UCL	0.32
Anderson-Darling Test Statistic	0.648	95% Bootstrap-t UCL	0.32
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	0.32
Kolmogorov-Smirnov Test Statistic	0.0741	95% Percentile Bootstrap UCL	0.32
Kolmogorov-Smirnov 5% Critical Value	0.0963	95% BCA Bootstrap UCL	0.319
Data appear Gamma Distributed at 5% Significance Level			
		95% Chebyshev(Mean, Sd) UCL	0.344
		97.5% Chebyshev(Mean, Sd) UCL	0.36
		99% Chebyshev(Mean, Sd) UCL	0.392
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.321		
95% Adjusted Gamma UCL	0.321		
Potential UCL to Use			
		Use 95% Student's-t UCL	0.32

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

U234

General Statistics		
Number of Valid Observations	56	Number of Distinct Observations 51
Number of Missing Values	30	
Raw Statistics		
	Log-transformed Statistics	
Minimum	0.42	Minimum of Log Data -0.868
Maximum	7.17	Maximum of Log Data 1.97
Mean	1.329	Mean of log Data 0.111
Median	1.08	SD of log Data 0.557
SD	1.028	
Std. Error of Mean	0.137	
Coefficient of Variation	0.773	
Skewness	3.756	
Relevant UCL Statistics		
Normal Distribution Test	Lognormal Distribution Test	
Lilliefors Test Statistic	0.209	Lilliefors Test Statistic 0.0794
Lilliefors Critical Value	0.118	Lilliefors Critical Value 0.118
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		
95% Student's-t UCL	1.559	95% H-UCL 1.507
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL 1.749
95% Adjusted-CLT UCL (Chen-1995)	1.629	97.5% Chebyshev (MVUE) UCL 1.943
95% Modified-t UCL (Johnson-1978)	1.571	99% Chebyshev (MVUE) UCL 2.325
Gamma Distribution Test		
k star (bias corrected)	2.878	Data Follow Appr. Gamma Distribution at 5% Significance Level
Theta Star	0.462	
MLE of Mean	1.329	
MLE of Standard Deviation	0.784	
nu star	322.4	
Approximate Chi Square Value (.05)	281.8	Nonparametric Statistics
Adjusted Level of Significance	0.0457	95% CLT UCL 1.555
Adjusted Chi Square Value	280.8	95% Jackknife UCL 1.559
		95% Standard Bootstrap UCL 1.545
Anderson-Darling Test Statistic	0.974	95% Bootstrap-t UCL 1.677
Anderson-Darling 5% Critical Value	0.757	95% Hall's Bootstrap UCL 2.599
Kolmogorov-Smirnov Test Statistic	0.113	95% Percentile Bootstrap UCL 1.569
Kolmogorov-Smirnov 5% Critical Value	0.12	95% BCA Bootstrap UCL 1.658
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL 1.928
		97.5% Chebyshev(Mean, Sd) UCL 2.187
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL 2.697
95% Approximate Gamma UCL	1.521	
95% Adjusted Gamma UCL	1.526	
Potential UCL to Use	Use 95% Approximate Gamma UCL 1.521	

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

U235

General Statistics			
Number of Valid Observations	85	Number of Distinct Observations	67
Number of Missing Values	1		
Raw Statistics			
	Log-transformed Statistics		
Minimum	0.009	Minimum of Log Data	-4.711
Maximum	0.37	Maximum of Log Data	-0.994
Mean	0.104	Mean of log Data	-2.435
Median	0.099	SD of log Data	0.629
SD	0.0635		
Std. Error of Mean	0.00688		
Coefficient of Variation	0.608		
Skewness	1.903		
Relevant UCL Statistics			
Normal Distribution Test	Lognormal Distribution Test		
Lilliefors Test Statistic	0.167	Lilliefors Test Statistic	0.129
Lilliefors Critical Value	0.0961	Lilliefors Critical Value	0.0961
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level		
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	0.116	95% H-UCL	0.122
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.141
95% Adjusted-CLT UCL (Chen-1995)	0.117	97.5% Chebyshev (MVUE) UCL	0.156
95% Modified-t UCL (Johnson-1978)	0.116	99% Chebyshev (MVUE) UCL	0.185
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	2.925	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0357		
MLE of Mean	0.104		
MLE of Standard Deviation	0.061		
nu star	497.2		
Approximate Chi Square Value (.05)	446.5	Nonparametric Statistics	
Adjusted Level of Significance	0.0472	95% CLT UCL	0.116
Adjusted Chi Square Value	445.7	95% Jackknife UCL	0.116
		95% Standard Bootstrap UCL	0.115
Anderson-Darling Test Statistic	0.969	95% Bootstrap-t UCL	0.118
Anderson-Darling 5% Critical Value	0.759	95% Hall's Bootstrap UCL	0.118
Kolmogorov-Smirnov Test Statistic	0.102	95% Percentile Bootstrap UCL	0.115
Kolmogorov-Smirnov 5% Critical Value	0.0977	95% BCA Bootstrap UCL	0.117
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.134
		97.5% Chebyshev(Mean, Sd) UCL	0.147
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.173
95% Approximate Gamma UCL	0.116		
95% Adjusted Gamma UCL	0.116		
Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL		
			0.134

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

U235

General Statistics			
Number of Valid Observations	50	Number of Distinct Observations	39
Number of Missing Values	36		
Raw Statistics			
	Log-transformed Statistics		
Minimum	0.026	Minimum of Log Data	-3.65
Maximum	0.244	Maximum of Log Data	-1.411
Mean	0.127	Mean of log Data	-2.131
Median	0.124	SD of log Data	0.384
SD	0.0432		
Std. Error of Mean	0.00611		
Coefficient of Variation	0.342		
Skewness	0.496		
Relevant UCL Statistics			
Normal Distribution Test	Lognormal Distribution Test		
Shapiro Wilk Test Statistic	0.975	Shapiro Wilk Test Statistic	0.938
Shapiro Wilk Critical Value	0.947	Shapiro Wilk Critical Value	0.947
Data appear Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level		
Assuming Normal Distribution			
95% Student's-t UCL	0.137	95% H-UCL	0.141
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.159
95% Adjusted-CLT UCL (Chen-1995)	0.137	97.5% Chebyshev (MVUE) UCL	0.172
95% Modified-t UCL (Johnson-1978)	0.137	99% Chebyshev (MVUE) UCL	0.199
Gamma Distribution Test			
k star (bias corrected)	7.504	Data appear Normal at 5% Significance Level	
Theta Star	0.0169		
MLE of Mean	0.127		
MLE of Standard Deviation	0.0462		
nu star	750.4		
Approximate Chi Square Value (.05)	687.8	Nonparametric Statistics	
Adjusted Level of Significance	0.0452	95% CLT UCL	0.137
Adjusted Chi Square Value	686.1	95% Jackknife UCL	0.137
		95% Standard Bootstrap UCL	0.136
Anderson-Darling Test Statistic	0.346	95% Bootstrap-t UCL	0.138
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	0.138
Kolmogorov-Smirnov Test Statistic	0.0909	95% Percentile Bootstrap UCL	0.137
Kolmogorov-Smirnov 5% Critical Value	0.125	95% BCA Bootstrap UCL	0.137
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.153
		97.5% Chebyshev(Mean, Sd) UCL	0.165
		99% Chebyshev(Mean, Sd) UCL	0.187
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.138		
95% Adjusted Gamma UCL	0.138		
Potential UCL to Use	Use 95% Student's-t UCL		0.137

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

U238

General Statistics			
Number of Valid Observations	56	Number of Distinct Observations	52
Number of Missing Values	30		
Raw Statistics			
	Log-transformed Statistics		
Minimum	0.47	Minimum of Log Data	-0.755
Maximum	6.42	Maximum of Log Data	1.859
Mean	1.369	Mean of log Data	0.167
Median	1.095	SD of log Data	0.514
SD	0.932		
Std. Error of Mean	0.125		
Coefficient of Variation	0.681		
Skewness	3.261		
Relevant UCL Statistics			
Normal Distribution Test	Lognormal Distribution Test		
Lilliefors Test Statistic	0.168	Lilliefors Test Statistic	0.0767
Lilliefors Critical Value	0.118	Lilliefors Critical Value	0.118
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	1.578	95% H-UCL	1.538
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.77
95% Adjusted-CLT UCL (Chen-1995)	1.632	97.5% Chebyshev (MVUE) UCL	1.954
95% Modified-t UCL (Johnson-1978)	1.587	99% Chebyshev (MVUE) UCL	2.315
Gamma Distribution Test			
	Data Distribution		
k star (bias corrected)	3.377	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	0.406		
MLE of Mean	1.369		
MLE of Standard Deviation	0.745		
nu star	378.2		
Approximate Chi Square Value (.05)	334.1	Nonparametric Statistics	
Adjusted Level of Significance	0.0457	95% CLT UCL	1.574
Adjusted Chi Square Value	333	95% Jackknife UCL	1.578
		95% Standard Bootstrap UCL	1.568
Anderson-Darling Test Statistic	1.016	95% Bootstrap-t UCL	1.676
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	1.895
Kolmogorov-Smirnov Test Statistic	0.11	95% Percentile Bootstrap UCL	1.572
Kolmogorov-Smirnov 5% Critical Value	0.12	95% BCA Bootstrap UCL	1.616
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.912
		97.5% Chebyshev(Mean, Sd) UCL	2.147

Assuming Gamma Distribution	99% Chebyshev(Mean, Sd) UCL	2.609
95% Approximate Gamma UCL	1.55	
95% Adjusted Gamma UCL	1.555	
Potential UCL to Use	Use 95% Approximate Gamma UCL	1.55

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Arsenic

Background Data: Arsenic

Raw Statistics

	Site	Background
Number of Valid Observations	84	12
Number of Missing Values	2	0
Number of Distinct Observations	79	12
Minimum	0.016	4.25
Maximum	10.6	5.52
Mean	4.497	4.803
Median	4.335	4.68
SD	1.446	0.4
SE of Mean	0.158	0.115

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	3943
WMW Test U-Stat	-1.457
WMW Critical Value (0.050)	1.645
P-Value	0.927

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Lead

Background Data: Lead

Raw Statistics

	Site	Background
Number of Valid Observations	84	12
Number of Missing Values	2	0
Number of Distinct Observations	74	11
Minimum	0.019	9.46
Maximum	27.7	14.2
Mean	12.75	11.13
Median	12.15	10.55
SD	5.337	1.559
SE of Mean	0.582	0.45

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4120
WMW Test U-Stat	0.499
WMW Critical Value (0.050)	1.645
P-Value	0.309

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site \leq Background
P-Value \geq alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Molybdenum

Background Data: Molybdenum

Raw Statistics

	Site	Background
Number of Valid Observations	84	12
Number of Missing Values	2	0
Number of Distinct Observations	77	11
Minimum	0.023	0.343
Maximum	1.74	0.623
Mean	0.719	0.407
Median	0.657	0.386
SD	0.288	0.0776
SE of Mean	0.0314	0.0224

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC \leq Mean/Median of Background

Site Rank Sum W-Stat	4465
WMW Test U-Stat	4.321
WMW Critical Value (0.050)	1.645
P-Value	7.78E-06

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Selenium

Background Data: Selenium

Raw Statistics

	Site	Background
Number of Valid Observations	46	12
Number of Missing Values	31	0
Number of Distinct Observations	45	12
Minimum	0.022	0.349
Maximum	2.2	2.03
Mean	0.615	0.555
Median	0.531	0.404
SD	0.367	0.472
SE of Mean	0.0541	0.136

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1435
WMW Test U-Stat	1.488
WMW Critical Value (0.050)	1.645
P-Value	0.0684

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File Milan_Metals.wst

Full Precision OFF

Confidence Coefficient 95%

Substantial Difference 0

Selected Null Hypothesis Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)

Alternative Hypothesis Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Vanadium

Background Data: Vanadium

Raw Statistics

	Site	Background
Number of Valid Observations	46	12
Number of Missing Values	31	0
Number of Distinct Observations	40	12
Minimum	0.022	20.4
Maximum	38.9	36.5
Mean	23.95	27.55
Median	23.4	28.05
SD	7.383	4.472
SE of Mean	1.088	1.291

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1260
WMW Test U-Stat	-1.881
WMW Critical Value (0.050)	1.645

P-Value 0.97

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File Milan_Metals.wst

Full Precision OFF

Confidence Coefficient 95%

Substantial Difference 0

Selected Null Hypothesis Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)

Alternative Hypothesis Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Alpha

Background Data: Alpha

Raw Statistics

	Site	Background
Number of Valid Observations	86	12
Number of Distinct Observations	55	11
Minimum	0.8	2
Maximum	26.6	6.7
Mean	8.047	4.908
Median	7.85	5.7
SD	3.753	1.786
SE of Mean	0.405	0.515

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat 4543

WMW Test U-Stat 3.089

WMW Critical Value (0.050) 1.645

P-Value 0.00101

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File Milan_Metals.wst

Full Precision OFF

Confidence Coefficient 95%

Substantial Difference 0

Selected Null Hypothesis Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)

Alternative Hypothesis Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Ba140

Background Data: Ba140

Raw Statistics

	Site	Background
Number of Valid Observations	86	12
Number of Distinct Observations	1	2
Minimum	0	0
Maximum	0	0.825
Mean	0	0.0688
Median	0	0
SD	0	0.238
SE of Mean	0	0.0688

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat 4214

WMW Test U-Stat -0.471

WMW Critical Value (0.050)	1.645
P-Value	0.681

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Beta

Background Data: Beta

Raw Statistics

	Site	Background
Number of Valid Observations	86	12
Number of Distinct Observations	69	11
Minimum	11	19.1
Maximum	42.7	27.6
Mean	25.93	24.16
Median	25.85	24.35
SD	4.966	2.514
SE of Mean	0.536	0.726

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4376
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WMW Test U-Stat	1.279
WMW Critical Value (0.050)	1.645
P-Value	0.1

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File Milan_Metals.wst

Full Precision OFF

Confidence Coefficient 95%

Substantial Difference 0

Selected Null Hypothesis Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)

Alternative Hypothesis Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Bi212

Background Data: Bi212

Raw Statistics

	Site	Background
Number of Valid Observations	86	12
Number of Distinct Observations	56	11
Minimum	0.48	0.87
Maximum	1.57	1.34
Mean	1.017	1.124
Median	1.045	1.115
SD	0.263	0.137
SE of Mean	0.0284	0.0396

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4132
WMW Test U-Stat	-1.366
WMW Critical Value (0.050)	1.645
P-Value	0.914

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File Milan_Metals.wst

Full Precision OFF

Confidence Coefficient 95%

Substantial Difference 0

Selected Null Hypothesis Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)

Alternative Hypothesis Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Bi214

Background Data: Bi214

Raw Statistics

	Site	Background
Number of Valid Observations	86	12
Number of Distinct Observations	62	11
Minimum	0.494	0.806
Maximum	2.79	1.05
Mean	1.087	0.904
Median	0.97	0.92
SD	0.368	0.0822
SE of Mean	0.0397	0.0237

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4399
WMW Test U-Stat	1.534
WMW Critical Value (0.050)	1.645
P-Value	0.0626

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File Milan_Metals.wst

Full Precision OFF

Confidence Coefficient 95%

Substantial Difference 0

Selected Null Hypothesis Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)

Alternative Hypothesis Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Co60

Background Data: Co60

Raw Statistics

	Site	Background
Number of Valid Observations	86	12
Number of Distinct Observations	1	1
Minimum	0	0
Maximum	0	0
Mean	0	0
Median	0	0
SD	0	0
SE of Mean	0	0

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4257
WMW Test U-Stat	-0.00542
WMW Critical Value (0.050)	1.645
P-Value	0.502

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Cs137

Background Data: Cs137

Raw Statistics

	Site	Background
Number of Valid Observations	86	12
Number of Distinct Observations	62	9
Minimum	0.0113	0.053
Maximum	0.123	0.093
Mean	0.0628	0.0676
Median	0.061	0.0645
SD	0.0223	0.0107
SE of Mean	0.0024	0.00309

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC \leq Mean/Median of Background

Site Rank Sum W-Stat	4163
WMW Test U-Stat	-1.03
WMW Critical Value (0.050)	1.645
P-Value	0.848

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site \leq Background

P-Value \geq alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File Milan_Metals.wst

Full Precision OFF

Confidence Coefficient 95%

Substantial Difference 0

Selected Null Hypothesis Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)

Alternative Hypothesis Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: I131

Background Data: I131

Raw Statistics

	Site	Background
Number of Valid Observations	86	12
Number of Distinct Observations	1	1
Minimum	0	0
Maximum	0	0
Mean	0	0
Median	0	0
SD	0	0
SE of Mean	0	0

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC \leq Mean/Median of Background

Site Rank Sum W-Stat	4257
WMW Test U-Stat	-0.00542
WMW Critical Value (0.050)	1.645
P-Value	0.502

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site \leq Background

P-Value \geq alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: K40

Background Data: K40

Raw Statistics

	Site	Background
Number of Valid Observations	86	12
Number of Distinct Observations	49	10
Minimum	12.7	16.6
Maximum	20.7	19.9
Mean	16.48	17.82
Median	16.75	17.65
SD	1.702	0.963
SE of Mean	0.184	0.278

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC \leq Mean/Median of Background

Site Rank Sum W-Stat	4013
WMW Test U-Stat	-2.65
WMW Critical Value (0.050)	1.645
P-Value	0.996

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site \leq Background

P-Value \geq alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Pa234m

Background Data: Pa234m

Raw Statistics

	Site	Background
Number of Valid Observations	65	4
Number of Missing Values	21	4
Number of Distinct Observations	45	4
Minimum	0	0.9
Maximum	4.8	1.6
Mean	1.631	1.15
Median	1.4	1.05

SD	0.905	0.31
SE of Mean	0.112	0.155

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2323
WMW Test U-Stat	1.22
WMW Critical Value (0.050)	1.645
P-Value	0.111

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File Milan_Metals.wst

Full Precision OFF

Confidence Coefficient 95%

Substantial Difference 0

Selected Null Hypothesis Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)

Alternative Hypothesis Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Pb212

Background Data: Pb212

Raw Statistics

	Site	Background
Number of Valid Observations	86	12
Number of Distinct Observations	66	10
Minimum	0.518	0.89
Maximum	1.59	1.22
Mean	0.961	1.044
Median	0.965	1.04

SD	0.257	0.111
SE of Mean	0.0277	0.0322

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4134
WMW Test U-Stat	-1.338
WMW Critical Value (0.050)	1.645
P-Value	0.91

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File Milan_Metals.wst

Full Precision OFF

Confidence Coefficient 95%

Substantial Difference 0

Selected Null Hypothesis Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)

Alternative Hypothesis Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Pb214

Background Data: Pb214

Raw Statistics

	Site	Background
Number of Valid Observations	86	12
Number of Distinct Observations	66	9
Minimum	0.524	0.84
Maximum	2.99	1.1
Mean	1.164	0.97

Median	1.045	0.985
SD	0.392	0.0899
SE of Mean	0.0422	0.026

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4398
WMW Test U-Stat	1.523
WMW Critical Value (0.050)	1.645
P-Value	0.0639

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Ra223

Background Data: Ra223

Raw Statistics

	Site	Background
Number of Valid Observations	72	9
Number of Missing Values	14	3
Number of Distinct Observations	60	9
Minimum	0.125	0.224

Maximum	0.449	0.344
Mean	0.26	0.272
Median	0.252	0.263
SD	0.0705	0.0383
SE of Mean	0.00831	0.0128

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2894
WMW Test U-Stat	-0.879
WMW Critical Value (0.050)	1.645
P-Value	0.81

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Ra226

Background Data: Ra226

Raw Statistics

	Site	Background
Number of Valid Observations	86	12
Number of Distinct Observations	69	11
Minimum	0	1.29

Maximum	6.04	2
Mean	2.037	1.702
Median	1.825	1.74
SD	0.881	0.209
SE of Mean	0.095	0.0603

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4364
WMW Test U-Stat	1.149
WMW Critical Value (0.050)	1.645
P-Value	0.125

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Ra228

Background Data: Ra228

Raw Statistics

	Site	Background
Number of Valid Observations	86	12
Number of Distinct Observations	63	11

Minimum	0.498	0.91
Maximum	1.58	1.26
Mean	0.983	1.08
Median	0.97	1.11
SD	0.249	0.11
SE of Mean	0.0269	0.0317

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4119
WMW Test U-Stat	-1.501
WMW Critical Value (0.050)	1.645
P-Value	0.933

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Th227

Background Data: Th227

Raw Statistics

	Site	Background
Number of Valid Observations	62	5

Number of Missing Values	24	0
Number of Distinct Observations	47	5
Minimum	-0.005	0.061
Maximum	0.32	0.14
Mean	0.0925	0.0972
Median	0.081	0.1
SD	0.0687	0.0343
SE of Mean	0.00873	0.0153

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2078
WMW Test U-Stat	-0.728
WMW Critical Value (0.050)	1.645
P-Value	0.767

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Th228

Background Data: Th228

Raw Statistics

Site	Background
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Number of Valid Observations	56	5
Number of Missing Values	30	0
Number of Distinct Observations	47	5
Minimum	0.48	0.98
Maximum	2.63	1.44
Mean	1.099	1.234
Median	1.01	1.21
SD	0.408	0.186
SE of Mean	0.0546	0.0833

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1683
WMW Test U-Stat	-1.42
WMW Critical Value (0.050)	1.645
P-Value	0.922

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options	
From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Th230

Background Data: Th230

Raw Statistics

	Site	Background
Number of Valid Observations	56	5
Number of Missing Values	30	0
Number of Distinct Observations	50	5
Minimum	0.56	0.7
Maximum	3.71	1.56
Mean	1.423	1.098
Median	1.26	1.05
SD	0.647	0.31
SE of Mean	0.0864	0.139

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1782
WMW Test U-Stat	1.183
WMW Critical Value (0.050)	1.645
P-Value	0.118

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File Milan_Metals.wst

Full Precision OFF

Confidence Coefficient 95%

Substantial Difference 0

Selected Null Hypothesis Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)

Alternative Hypothesis Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Th232

Background Data: Th232

Raw Statistics

	Site	Background
Number of Valid Observations	56	5
Number of Missing Values	30	0
Number of Distinct Observations	46	5
Minimum	0.46	0.87
Maximum	1.76	1.12
Mean	0.952	1.036
Median	0.895	1.09
SD	0.295	0.104
SE of Mean	0.0395	0.0463

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1689
WMW Test U-Stat	-1.262
WMW Critical Value (0.050)	1.645
P-Value	0.897

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Th234

Background Data: Th234

Raw Statistics

	Site	Background
Number of Valid Observations	72	9
Number of Missing Values	14	3
Number of Distinct Observations	51	9
Minimum	0	0.32
Maximum	4.24	0.88
Mean	0.928	0.577
Median	0.67	0.56
SD	0.682	0.202
SE of Mean	0.0804	0.0672

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	3068
WMW Test U-Stat	1.736
WMW Critical Value (0.050)	1.645
P-Value	0.0413

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: TI208

Background Data: TI208

Raw Statistics

	Site	Background
Number of Valid Observations	86	12
Number of Distinct Observations	78	12
Minimum	0.158	0.285
Maximum	0.475	0.394
Mean	0.305	0.339
Median	0.303	0.329
SD	0.0812	0.0348
SE of Mean	0.00875	0.01

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	4124
WMW Test U-Stat	-1.447
WMW Critical Value (0.050)	1.645
P-Value	0.926

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: U234

Background Data: U234

Raw Statistics

	Site	Background
Number of Valid Observations	56	5
Number of Missing Values	30	0
Number of Distinct Observations	51	5
Minimum	0.42	0.6
Maximum	7.17	1.22
Mean	1.329	0.91
Median	1.08	0.88
SD	1.028	0.243
SE of Mean	0.137	0.109

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC \leq Mean/Median of Background

Site Rank Sum W-Stat	1775
WMW Test U-Stat	1.012
WMW Critical Value (0.050)	1.645
P-Value	0.156

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site \leq Background

P-Value \geq alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: U235

Background Data: U235

Raw Statistics

	Site	Background
Number of Valid Observations	85	12
Number of Missing Values	1	0
Number of Distinct Observations	67	10
Minimum	0.009	0.059
Maximum	0.37	0.123
Mean	0.104	0.0981
Median	0.099	0.102
SD	0.0635	0.0185
SE of Mean	0.00688	0.00533

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC \leq Mean/Median of Background

Site Rank Sum W-Stat	4143
WMW Test U-Stat	-0.252
WMW Critical Value (0.050)	1.645
P-Value	0.599

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site \leq Background

P-Value \geq alpha (0.05)

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	Milan_Metals.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: U238

Background Data: U238

Raw Statistics

	Site	Background
Number of Valid Observations	56	5
Number of Missing Values	30	0
Number of Distinct Observations	52	5
Minimum	0.47	0.73
Maximum	6.42	1.21
Mean	1.369	0.95
Median	1.095	0.89
SD	0.932	0.207
SE of Mean	0.125	0.0925

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC \leq Mean/Median of Background

Site Rank Sum W-Stat	1779
WMW Test U-Stat	1.104
WMW Critical Value (0.050)	1.645
P-Value	0.135

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site \leq Background

P-Value \geq alpha (0.05)